

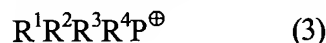
Patent Claims

1. A process for preparing organomodified polysiloxanes which comprises reacting a SiH-containing polysiloxane with a compound that contains C-C multiple bonds in the presence of transition metal catalysts, wherein

- a) the reaction is carried out in the presence of an ionic liquid and
- b) after the reaction is complete, the ionic liquid together with the dissolved catalyst is separated from the reaction mixture.

2. The process according to claim 1, which further comprises adding the recovered ionic liquid containing the dissolved catalyst to a reaction wherein a SiH-containing polysiloxane is reacted with a compound that contains a C-C multiple bond.

3. The process as claimed in claim 1, wherein the ionic liquid comprises at least one cation of the formulae (1) to (4):



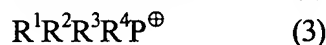
where

R^1, R^2, R^3, R^4 are identical or different and are each hydrogen, a linear or branched aliphatic hydrocarbon radical, a cycloaliphatic hydrocarbon radical, an aromatic hydrocarbon radical carbon atoms, an alkylaryl radical, a linear or branched aliphatic hydrocarbon radical which is interrupted by one or more hetero atoms, a linear or branched aliphatic hydrocarbon radical which has is interrupted by one or more functional groups selected from the group consisting of -O-C(O)-, -(O)C-O-, -NH-C(O)-, -(O)C-NH-, -(CH₃)N-C(O)-, -(O)C-N(CH₃), -S(O₂)-O-, -O-S(O₂)-, -S(O₂)-NH-, -NH-S(O₂)-, -S(O₂)-N(CH₃)-, -N(CH₃)-S(O₂)-, a linear or branched aliphatic hydrocarbon radical and is functionalized at the end of the chain by OH, NH₂, N(H)R' where R' is an alkyl radical, and a polyether which may have a block or random structure and has the formula -(R⁵-O)_n-R⁶,

where

R^5 is a linear or branched hydrocarbon radical,
 n is from 1 to 30 and
 R^6 is hydrogen, a linear or branched aliphatic hydrocarbon radical, a cycloaliphatic hydrocarbon radical, an aromatic hydrocarbon radical, an alkylaryl radical carbon atoms or a $-C(O)-R^7$ radical where
 R^7 is a linear or branched aliphatic hydrocarbon radical atoms, a cycloaliphatic hydrocarbon radical, an aromatic hydrocarbon radical or an alkylaryl radical.

4. The process as claimed in claim 1, wherein the ionic liquid comprises at least one cation of the formulae (1) to (4):



where

R^1, R^2, R^3, R^4 are identical or different and are each hydrogen, a linear or branched aliphatic hydrocarbon radical having from 1 to 20 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 30 carbon atoms, an aromatic hydrocarbon radical having from 6 to 30 carbon atoms, an alkylaryl radical having from 7 to 40 carbon atoms, a linear or branched aliphatic hydrocarbon radical which has from 2 to 20 carbon atoms and is interrupted by one or more hetero atoms selected from the group consisting of oxygen, NH, and NR' where R' is a C_1-C_5 -alkyl radical, a linear or branched aliphatic hydrocarbon radical which has from 2 to 20 carbon atoms and is interrupted by one or more functional groups selected from the group consisting of $-O-C(O)-$, $-(O)C-O-$, $-NH-C(O)-$, $-(O)C-NH$, $-(CH_3)N-C(O)-$, $-(O)C-N(CH_3)-$, $-S(O_2)-O-$, $-O-S(O_2)-$, $-S(O_2)-NH-$, $-NH-S(O_2)-$, $-S(O_2)-N(CH_3)-$, $-N(CH_3)-S(O_2)-$, a linear or branched aliphatic hydrocarbon radical which has from 1 to 20 carbon atoms and is functionalized at the end of the chain by OH, NH_2 , $N(H)R'$ where R' is a C_1-C_5 -alkyl radical, and a polyether which may have a block or random structure and has the formula $-(R^5-O)_n-R^6$,

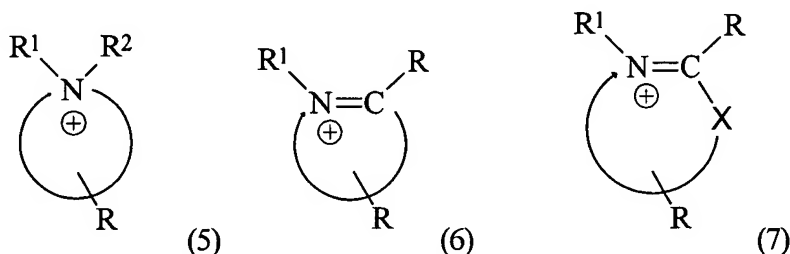
where

R^5 is a linear or branched hydrocarbon radical containing from 2 to 4 carbon atoms,
 n is from 1 to 30 and
 R^6 is hydrogen, a linear or branched aliphatic hydrocarbon radical having from 1 to 20 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 30 carbon atoms, an aromatic

hydrocarbon radical having from 6 to 30 carbon atoms, an alkylaryl radical having 7 to 40 carbon atoms or a $-C(O)-R^7$ radical where

R^7 is a linear or branched aliphatic hydrocarbon radical having from 1 to 20 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 30 carbon atoms, an aromatic hydrocarbon radical having from 6 to 30 carbon atoms or an alkylaryl radical having from 7 to 40 carbon atoms.

5. The process as claimed in claim 1, wherein the ionic liquid comprises at least one cation which is derived from saturated or unsaturated cyclic compounds or aromatic compounds each having at least one trivalent nitrogen atom in a 4- to 10-membered heterocyclic ring in which additional heteroatoms are optionally be present and have one of the formulae (5), (6) and (7),



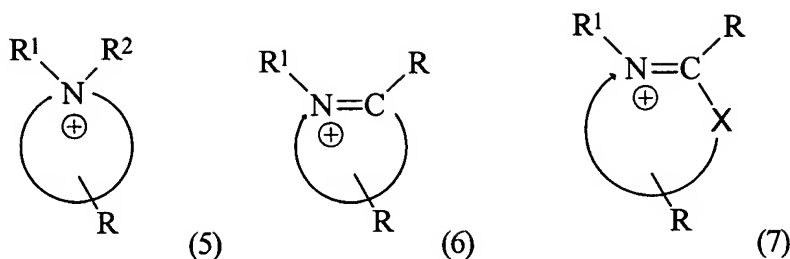
where

R^1 and R^2 are as defined above,

R is a hydrogen atom, a linear or branched aliphatic hydrocarbon radical, a cycloaliphatic hydrocarbon radical atoms, an aromatic hydrocarbon radical or an alkylaryl radical having from, and

X is an oxygen atom, a sulfur atom or a substituted nitrogen atom.

6. The process as claimed in claim 5, wherein the ionic liquid comprises at least one cation which is derived from saturated or unsaturated cyclic compounds or aromatic compounds each having at least one trivalent nitrogen atom in a 4- to 10-membered heterocyclic ring in which additional heteroatoms are optionally present and have one of the formulae (5), (6) and (7),



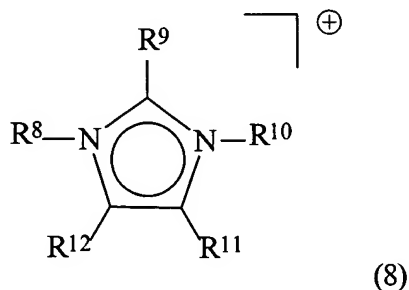
where

R^1 and R^2 are as defined above,

R is a hydrogen atom, a linear or branched aliphatic hydrocarbon radical having from 1 to 20 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 30 carbon atoms, an aromatic hydrocarbon radical having from 6 to 30 carbon atoms or an alkylaryl radical having from 7 to 40 carbon atoms, and

X is an oxygen atom, a sulfur atom or a substituted nitrogen atom NR , wherein R is defined above.

7. The process as claimed in claim 1, wherein the ionic fluid comprises at least one cation of the formula,



where

$R^8, R^9, R^{10}, R^{11}, R^{12}$ are identical or different and are each hydrogen, a linear or branched aliphatic hydrocarbon radical, a cycloaliphatic hydrocarbon radical carbon atoms, an aromatic hydrocarbon radical, an alkylaryl radical, a linear or branched aliphatic hydrocarbon radical carbon atoms and is interrupted by one or more hetero atoms, a linear or branched aliphatic hydrocarbon radical which is interrupted by one or more functional groups selected from the group $-O-C(O)-$, $-(O)C-O-$, $-NH-C(O)-$, $-(O)C-NH$, $-(CH_3)N-C(O)-$, $-(O)C-N(CH_3)-$, $-S(O_2)-O-$, $-O-S(O_2)-$, $-S(O_2)-NH-$, $-NH-S(O_2)-$, $-S(O_2)-N(CH_3)-$, $-N(CH_3)-S(O_2)-$, a linear or branched aliphatic hydrocarbon radical which is functionalized at the end of the chain by

OH, NH₂, N(H)R' where R' is an alkyl radical, and a polyether group, which may have a block or random structure and has the formula $-(R^5-O)_n-R^6$,

where

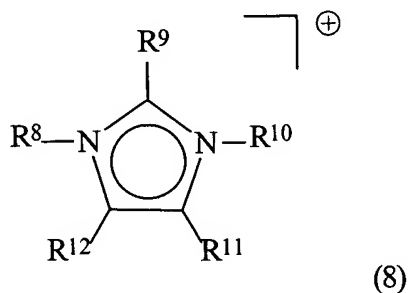
R⁵ is a hydrocarbon radical,

n is from 1 to 30 and

R⁶ is hydrogen, a linear or branched aliphatic hydrocarbon radical, a cycloaliphatic hydrocarbon radical, an aromatic hydrocarbon radical, an alkylaryl radical or a $-C(O)-R^7$ radical where

R⁷ is a linear or branched aliphatic hydrocarbon radical, a cycloaliphatic hydrocarbon radical, an aromatic hydrocarbon radical or an alkylaryl radical.

8. The process as claimed in claim 7, wherein the ionic fluid comprises at least one cation of the formula (8),



where

R⁸, R⁹, R¹⁰, R¹¹, R¹² are identical or different and are each hydrogen, a linear or branched aliphatic hydrocarbon radical having from 1 to 30 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 30 carbon atoms, an aromatic hydrocarbon radical having from 6 to 30 carbon atoms, an alkylaryl radical having from 7 to 40 carbon atoms, a linear or branched aliphatic hydrocarbon radical which has from 1 to 20 carbon atoms and is interrupted by one or more hetero atoms selected from the group consisting of oxygen, NH, and NR' where R' is a C₁-C₅-alkyl radical, a linear or branched aliphatic hydrocarbon radical which has from 1 to 20 carbon atoms and is interrupted by one or more functional groups selected from the group consisting of $-O-C(O)-$, $-(O)C-O-$, $-NH-C(O)-$, $-(O)C-NH$, $-(CH_3)N-C(O)-$, $-(O)C-N(CH_3)-$, $-S(O_2)-O-$, $-O-S(O_2)-$, $-S(O_2)-NH-$, $-NH-S(O_2)-$, $-S(O_2)-N(CH_3)-$, $-N(CH_3)-S(O_2)-$, a linear or branched aliphatic hydrocarbon radical which has from 1 to 20 carbon atoms and is functionalized at the end of the chain by OH, NH₂, N(H)R' where R' is a C₁-C₅-alkyl radical, and a polyether which may have a block or random structure and has the formula $-(R^5-O)_n-R^6$,

where

R^5 is a hydrocarbon radical containing from 2 to 4 carbon atoms,

n is from 1 to 30 and

R^6 is hydrogen, a linear or branched aliphatic hydrocarbon radical having from 1 to 20 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 30 carbon atoms, an aromatic hydrocarbon radical having from 6 to 30 carbon atoms, an alkylaryl radical having 7 to 40 carbon atoms or a $-C(O)-R^7$ radical where

R^7 is a linear or branched aliphatic hydrocarbon radical having from 1 to 20 carbon atoms, a cycloaliphatic hydrocarbon radical having from 5 to 30 carbon atoms, an aromatic hydrocarbon radical having from 6 to 30 carbon atoms or an alkylaryl radical having from 7 to 40 carbon atoms.

9. The process as claimed in claim 1, wherein the ionic liquid comprises an anion selected from the group consisting of halides, bis(perfluoroalkylsulfonyl)amides, alkyltosylates and aryltosylates, perfluoroalkyltosylates, nitrates, sulfates, hydrogensulfates, alkylsulfates and arylsulfates, perfluoroalkylsulfates, sulfonates, alkylsulfonates and arylsulfonates, perfluorinated alkylsulfonates and arylsulfonates, alkylcarboxylates and arylcarboxylates, perfluoroalkylcarboxylates, perchlorates, tetrachloroaluminates, saccharinates, dicyanamide, tetrafluoroborate, hexafluorophosphate and phosphate.

10. A process as claimed in claim 1, wherein the ionic liquid comprises a cation selected from the group consisting of imidazolium ions substituted in the 2-position, together with methylsulfate as anion.

11. The process according to claim 10, wherein the imidazolium ion is 1,2,3-trimethylimidazolium.

12. The process as claimed in claim 1, wherein the ionic liquid comprises a cation selected from the group consisting of pyridinium ions together with tetrafluoroborate as anion.

13. The process as claimed in claim 1, wherein the ionic liquid comprises a mixture of two or more cations.

14. The process as claimed in claim 1, wherein the amount of ionic liquid present in the process is from about 0.1 to about 98% by weight, based upon the heterogeneous reaction mixture.

15. The process as claimed in claim 1, wherein the amount of ionic liquid present in the process is from about 0.1 to about 20% by weight, based upon the heterogeneous reaction mixture.

16. The process according to claim 1, wherein the amount of ionic liquid present in the process is from about 0.5 to about 5% by weight, based upon the heterogeneous reaction mixture.

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